

## PATENT COOPERATION TREATY

## PCT

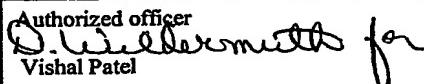
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

REC'D 11 MAY 2006

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(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>0815-044247</b>	<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416	
International application No. <b>PCT/US04/19496</b>	International filing date ( <i>day/month/year</i> ) <b>18 June 2004 (18.06.2004)</b>	Priority date ( <i>day/month/year</i> ) <b>20 June 2003 (20.06.2003)</b>
International Patent Classification (IPC) or national classification and IPC <b>IPC: F16J 15/40( 2006.01);F01D 11/00( 2006.01) F01D 1/02( 2006.01) USPC: 277/347,409-416,418-421;415/208.2,171.1,191</b>		
Applicant <b>ELLIOTT COMPANY</b>		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>2</u> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of ___ sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>		
Date of submission of the demand <b>19 April 2005 (19.04.2005)</b>	Date of completion of this report <b>21 April 2006 (21.04.2006)</b>	
Name and mailing address of the IPEA/ US Mail Stop PCT, Attn: IPEA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Authorized officer  Vishal Patel Telephone No. 571-272-7060	

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US04/19496

## Box No. I Basis of the report

1. With regard to the language, this report is based on:

- the international application in the language in which it was filed.
- a translation of the international application into English, which is the language of a translation furnished for the purposes of:
- international search (under Rules 12.3 and 23.1(b))
  - publication of the international application (under Rule 12.4(a))
  - international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

- the international application as originally filed/furnished

- the description:

pages 1-3 as originally filed/furnished  
 pages\* NONE received by this Authority on \_\_\_\_\_  
 pages\* NONE received by this Authority on \_\_\_\_\_

- the claims:

pages 4 as originally filed/furnished  
 pages\* NONE as amended (together with any statement) under Article 19  
 pages\* NONE received by this Authority on \_\_\_\_\_  
 pages\* NONE received by this Authority on \_\_\_\_\_

- the drawings:

pages 1-3 as originally filed/furnished  
 pages\* NONE received by this Authority on \_\_\_\_\_  
 pages\* NONE received by this Authority on \_\_\_\_\_

- a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3.  The amendments have resulted in the cancellation of:

- the description, pages \_\_\_\_\_
- the claims, Nos. \_\_\_\_\_
- the drawings, sheets/figs \_\_\_\_\_
- the sequence listing (*specify*): \_\_\_\_\_
- any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- the description, pages \_\_\_\_\_
- the claims, Nos. \_\_\_\_\_
- the drawings, sheets/figs \_\_\_\_\_
- the sequence listing (*specify*): \_\_\_\_\_
- any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.  
PCT/US04/19496

**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Claims <u>3-6</u>	YES
	Claims <u>1 and 2</u>	NO
Inventive Step (IS)	Claims <u>NONE</u>	YES
	Claims <u>1-6</u>	NO
Industrial Applicability (IA)	Claims <u>1-6</u>	YES
	Claims <u>NONE</u>	NO

**2. Citations and Explanations (Rule 70.7)**

Claims 1-2 lack novelty under PCT Article 33(2) as being anticipated by Ambrosch et al (US. 4,273,510).

Ambrosch illustrates an apparatus for restricting axial flow through the clearance between a rotating shaft and a seal stator and providing effective damping to improve rotor stability having an abradable labyrinth seal (seal formed by 5) and swirl-reversal vanes (vanes formed by 6a) upstream of the labyrinth seal.

Claims 1-6 lack inventive step under PCT Article 33(3) as being obvious over Hagi et al. (US. 5,967,746) in view of Ambrosch et al (US. 4,273,510).

Hagi teaches an apparatus for restricting axial flow through the clearance between a rotating shaft and a seal stator and providing effective damping to improve rotor stability having an abradable labyrinth seal (seal formed by 2), the shaft comprises a first toothed axial section having a plurality of annular teeth (first section having the longest tooth), a second upstream toothed axial section having a few annular teeth from one to three (the teeth that are shorter than the longest teeth) and a section therebetween having a cylindrical surface of diameter less than the outer edge of the toothed section (diameter between two of the teeth). There is a smooth abradable coating on surface of the stator seal radially outward of the first toothed section (the abradable seal extends along the first and second toothed sections). Hagi teaches the invention substantially as claimed above but fails to teach that swirl-reversing vanes being fastened to the stator seal between the toothed section, the vanes having a v-shape that has a arc or a tapered ends. Ambrosch teaches to have seal sections (5), swirl-reversing vanes fastened to the stator seal, the vanes are in the seal section that lies on the stator (2) and the vanes are taught to be have arc or tapered ends (figure 7). It would have been obvious to one having ordinary skill in the art at the time the invention was made to configure the stator of Hagi to have swirl-reversing vanes as taught by Ambrosch, to provide reduction of oscillation of the shaft and to reduce forces that cause oscillation (column 4, lines 54-62 of Ambrosch).